

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
17 March 2005 (17.03.2005)

PCT

(10) International Publication Number
WO 2005/024349 A1

(51) International Patent Classification⁷: **G01D 5/353**

(21) International Application Number:
PCT/KR2004/002218

(22) International Filing Date:
2 September 2004 (02.09.2004)

(25) Filing Language: Korean

(26) Publication Language: English

(30) Priority Data:
10-2003-0062591
8 September 2003 (08.09.2003) KR

(71) Applicant (for all designated States except US): **DONAM SYSTEMS INC.** [KR/KR]; 59-4 Jang-dong, Yusong-gu, Daejeon-si 305-343 (KR).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **YONG, Jae Chul** [KR/KR]; #105-1101 Hyundai Town Apt., Banwall-ri, Taejeon-eub, Hwasung-si, Gyeonggi-do 445-973 (KR).
KIM, Jae Young [KR/KR]; #105-506 Dasarang Apt., Moksang-dong, Daedeuk-gu, Daejeon-si 306-210 (KR).

(74) Agent: **HWANG, Eui In**; 10th Floor, Hankook Tire Bldg., 647-15 Yeoksam-dong, Gangnam-gu, Seoul 135-723 (KR).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

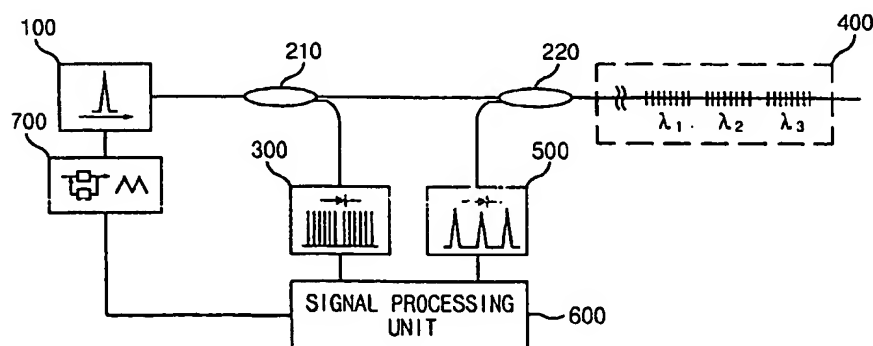
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

[Continued on next page]

(54) Title: **FIBER BRAGG GRATING SENSOR SYSTEM**



(57) Abstract: The present invention discloses a fiber Bragg grating sensor system. The system according to the present invention comprises a wavelength tunable laser; a coupler for splitting output light from the wavelength tunable laser into two directions; a reference wavelength generating unit for receiving one directional output light from the coupler and for generating reference wavelengths and an absolute reference wavelength in order to measure real-time wavelengths of the wavelength tunable laser; a fiber Bragg grating array for receiving the other directional output light from the coupler and for reflecting lights at each of the wavelengths of the grating therein; a fiber grating wavelength sensing unit for measuring the time when each of the reflected lights from the fiber Bragg grating array is detected; a signal processing unit for figuring wavelength variation information with the use of the measured signals from the reference wavelength generating unit and for obtaining each of wavelengths of the detected lights from the fiber grating wavelength sensing unit; and a laser wavelength control feedback unit for applying AC voltage and DC voltage to the wavelength tunable filter in the wavelength tunable laser. Also, polarization dependency in the sensor system can be removed further installing a depolarizer or a polarization scrambler at the output end of the wavelength tunable laser. By applying the present invention, measurement accuracy of the grating sensor system 20 can be improved due to enhanced wavelength stability and suppression of polarization dependency. Therefore, the fiber Bragg grating sensor system based on the present invention would replace conventional structure/construction diagnosis systems.

WO 2005/024349 A1



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.